

Description of a New Bivalve of the Genus *Macoma* from the Pliocene of Central California

BY

A. JAMES NIKAS III

460 Pacheco Street, San Francisco, California 94116

(1 Plate; 2 Text figures)

INTRODUCTION

DURING 1970 AND 1971 the author collected at several fossiliferous outcrops of the late Pliocene marine Merced (?) Formation (DIBBLEE, 1966), on Arastradero Road, near Stanford University, Santa Clara County, California. Collections secured from California Academy of Sciences Geology Locality 44020 and United States Geological Survey Cenozoic Locality M1715, which yielded several valves of an undescribed species of bivalve of the genus *Macoma*.

In 1971 Dr. Warren Addicott of the United States Geological Survey brought to my attention a number of valves belonging to the new *Macoma* described in this report, from the sea cliff area of New Brighton Beach, Santa Cruz County, California (M3618). During the same year I made collections at several fossiliferous exposures of the Pliocene Purisima Formation at New Brighton Beach. These investigations yielded several additional valves of the new *Macoma*. A detailed study of the fauna of this area and the associated faunas found at Sea Cliff State Beach and Capitola State Beach, Santa Cruz County, California is underway at present.

ACKNOWLEDGMENTS

I would like to express my sincere thanks to Dr. Warren Addicott and the late Dr. Leo Hertlein. Without their kind cooperation and assistance this paper would not have been possible.

I am grateful to James Carlton, Barry Roth, Dustin Chivers, Dr. Peter Rodda and the late Allyn Smith for their technical advice; to Darrel McKenzie, Ken Lucas, Dr. Raymond Sullivan and my parents I offer my deepest thanks for supplying transportation when it was needed. Sincere thanks to Mark Ghiorso, Gary Ronning, Mike

Bagatelos, Wayne Palsson, Jerry Howard and Alex Nikas for their assistance in the field. The photographs were taken by Joseph Dial.

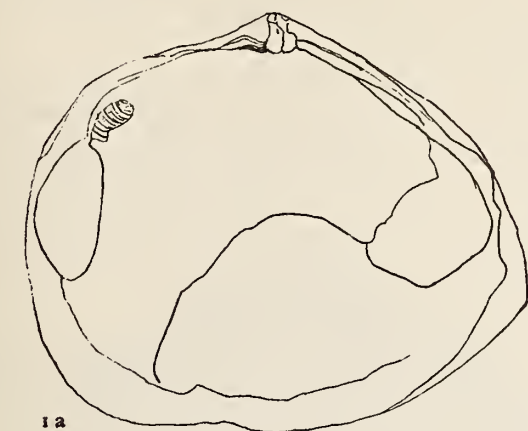
EULAMELLIBRANCHIA

TELLINIDAE Blainville, 1814

Macoma Leach, 1819*Macoma addicotti* Nikas, spec. nov.*Macoma*, new species?, aff. *M. nasuta* (Conrad).ADDICOTT, 1969. Proc. Calif. Acad. Sci. (4) 37
(3): 72-73; pl. 4, fig. 12

Diagnosis: A large, thick-shelled species of *Macoma* differing from other northwestern American species of the genus in that the posterior end of the left valve is sharply truncated and strongly flexed, the beak is slightly posterior to the midline, the right pallial sinus forms a 70° angle with the pallial line and the left pallial sinus forms a 40° angle with the posterior muscle scar.

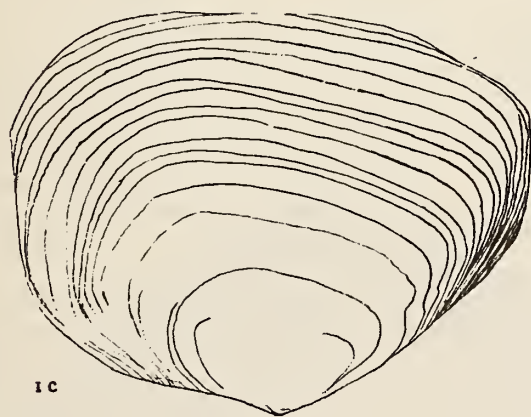
Description: The shell is large, thick, oval in outline, anterior end well rounded, posterior end broad and sharply truncated; beak slightly to the posterior of the center of the valve. The external surfaces of both valves sculptured only by irregular concentric growth lines. The ligamental groove extends approximately $\frac{3}{4}$ of the way along the dorsal margin, ending at the top of the posterior adductor muscle scar. The pallial sinus of the right valve extends forward from the posterior muscle scar approximately midway to the anterior adductor muscle scar where it curves steeply down to the pallial line. The pallial sinus of the left valve extends from the posterior



1a



1b



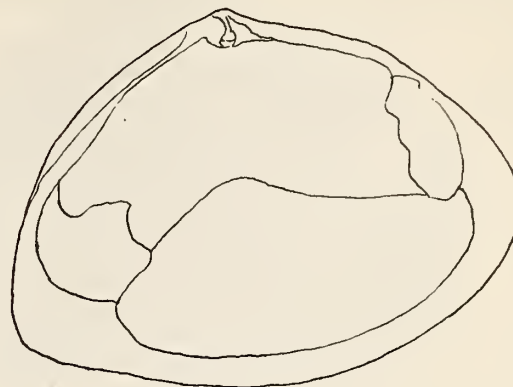
1c

Figure 1

Composite sketches of *Macoma addicotti* Nikas spec. nov.

right valve

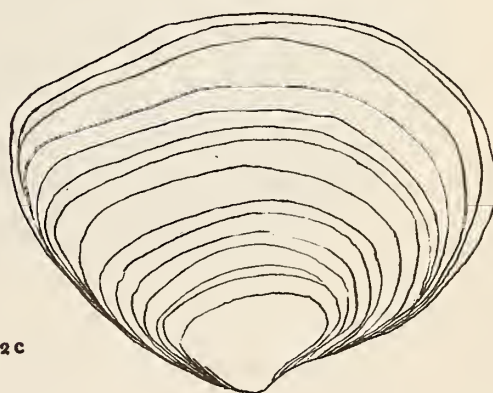
a - interior view; b - dorsal view; c - exterior view



2a



2b



2c

Figure 2

Composite sketches of *Macoma addicotti* Nikas spec. nov.

left valve

a - interior view; b - dorsal view; c - exterior view

muscle scar, rising slightly in the center of the valve and then slopes down to the anterior muscle scar. The shell is bent to the right at the posterior ends of both valves.

The left valve curves slightly from the umbo to halfway along the ligamental groove, where the curvature increases to a slight hook. The right valve is bent strongly

to the right beginning $\frac{2}{3}$ of the way along the dorsal margin.

Holotype: No. 55959 (California Academy of Sciences, Department of Geology Type Collection), from C. A. S. Geology Locality 44020, 763 m E of the intersection of Arastradero Road and Alpine Road, opposite the entrance road to the American Institute of Research, Palo Alto, California, U. S. G. S. Palo Alto, California quadrangle, 7 $\frac{1}{2}$ minute series (topographic), 1961 edition. Collector James Nikas, 1971. Late Pliocene. Both valves, right valve, height 60.5 mm, length 79.25 mm; left valve, height 59.5 mm, length 78.5 mm. Paratypes nos. 55957, 55958 have been deposited at the California Academy of Sciences. Paratypes have also been deposited at the United States National Museum of Natural History.

umbo and the posterior end of the shell, while on *M. nasuta* this flexure begins slightly to the anterior of the middle of the shell.

On the right valve of *Macoma addicotti* the pallial sinus forms a 70° angle with the pallial line, while the pallial sinus of the right valve of *M. nasuta* forms a 50° angle with the pallial line. The pallial sinus of the left valve curves down at the center of the shell and forms a 40° angle to the posterior muscle scar, while on *M. nasuta* the pallial sinus drops at about a 30° angle. The large maximum size of *M. addicotti* is an important diagnostic characteristic.

Macoma addicotti also resembles the Recent *M. brota* Dall, 1916. *Macoma addicotti* may be easily distinguished from *M. brota* by the characters cited in Table 2.

Table 1

Measurements of Holotype and Paratypes

Valve	Height	Length	Type No.	Depository
Left	60.5 mm.	79.25 mm.	Holotype No. 55956	C.A.S.
Right	59.5 mm.	78.5 mm.	Holotype No. 55956	C.A.S.
Right	66.0 mm.	85.0 mm.	Paratype No. 241063	U.S.N.M.
Left	68.0 mm.	91.0 mm.	Paratype No. 55957	C.A.S.
Left	51.5 mm.	73.0 mm.	Paratype No. 55958	C.A.S.
Left	63.5 mm.	86.0 mm.	Paratype No. 650970	U.S.N.M.

Discussion: *Macoma addicotti* is similar to and may be closely related to the northeastern Pacific species *M. nasuta* (Conrad, 1837), which at present ranges from Sitkalidak Island, Alaska to Cabo San Lucas, Baja California, Mexico (COAN, 1971: 42). *Macoma addicotti* can be readily distinguished from *M. nasuta* by the characteristics described in Table 2. *Macoma nasuta* is narrow dorsally and elongated posteriorly, while *M. addicotti* is broad and sharply truncated posteriorly. The beak is nearly central in *M. nasuta*, while in *M. addicotti* the beak is slightly to the posterior.

The left valve of *Macoma addicotti* is strongly flexed. As pointed out by ADDICOTT (1969: 72), the flexure on the left valve of *M. addicotti* begins midway between the

Age and Paleoecology: U. S. G. S. Locality M1715 and C. A. S. Locality 44020 are late Pliocene in age and assigned to the Merced (?) Formation (DIBBLEE, 1966); U. S. G. S. M3618 is Pliocene in age and designated as Purisima Formation.

Macoma nasuta (Conrad) ranges from Oligocene (?) to Recent (GRANT & GALE, 1931), while at present *M. addicotti* is recorded only from the Pliocene. *Macoma nasuta* and *M. addicotti* occur together at U. S. G. S. M1715 and U. S. G. S. M3618, but *M. nasuta* has not been recorded from C. A. S. 44020, while *M. addicotti* has been recorded from that locality. ADDICOTT (1969) states that the environment in which the taxa are found at U. S. G. S. M1715 and U. S. G. S. M1870 (which

Explanation of Figures 3 to 6

Macoma addicotti Nikas, spec. nov.

Figure 3: Holotype, CAS Dept. Geology Type Coll. no. 55956, from CAS Geology Locality 44020, Arastradero Road, Palo Alto, Santa Clara County, California; late Pliocene. Left valve, height 60.5 mm; length 79.25 mm. Interior view

Figure 4: Exterior view of left valve of holotype

Figure 5: Paratype, USNM 241063, from U. S. G. S. M3618, New Brighton State Beach, Santa Cruz County, California; Pliocene. Right valve, height 66.0 mm, length 85.0 mm. Exterior view

Figure 6: Interior view of paratype shown in Figure 5

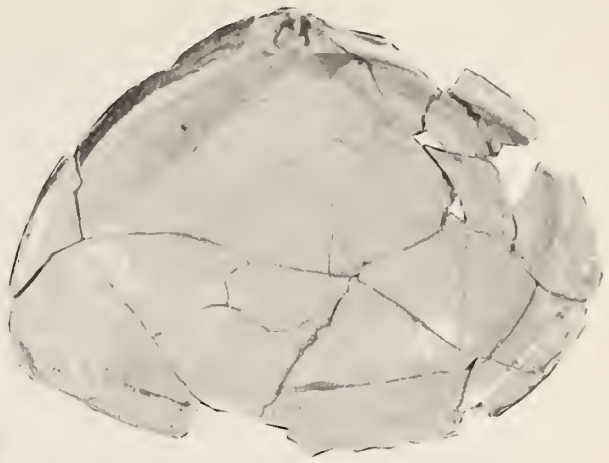


Figure 3

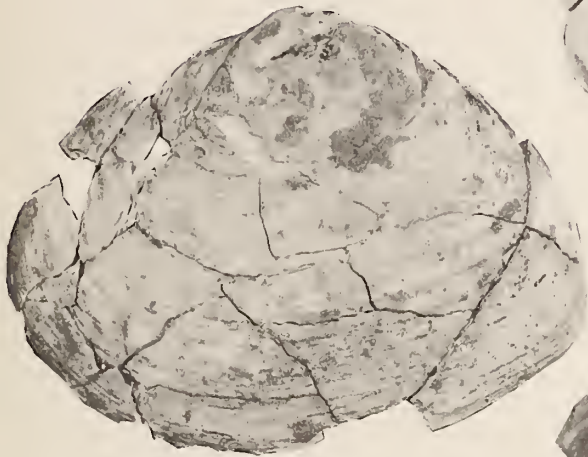


Figure 4

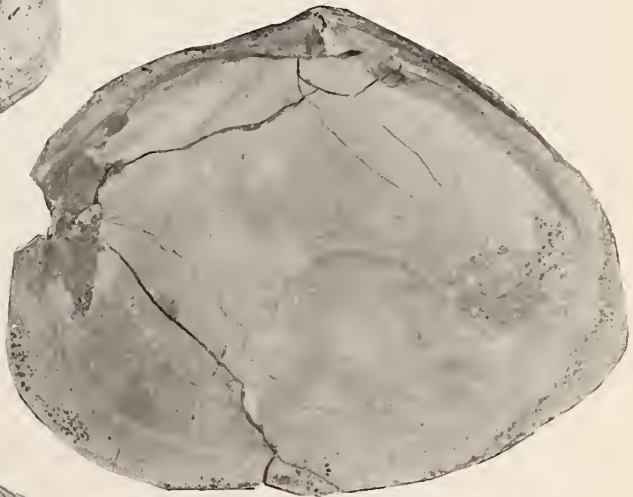


Figure 5

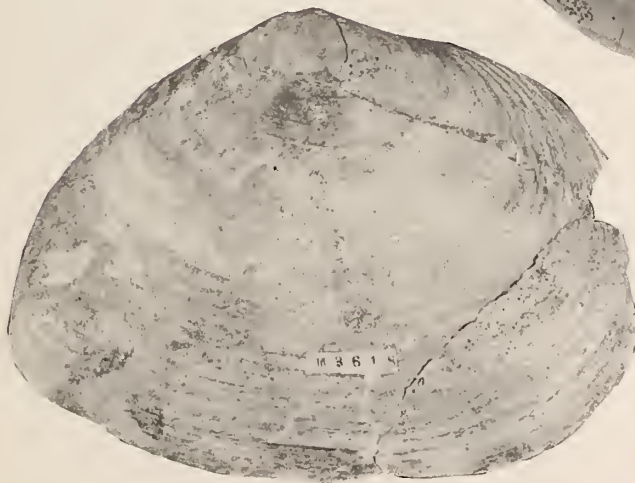


Figure 6